

WHAT IS CLAIMED IS:

1. A locking cap for a pipe end, the locking cap comprising a face plate and a plug portion, the face plate having a front surface and a rear surface, the plug portion having a front surface, a rear surface and a side surface, a slot extending longitudinally between the front surface and the rear surface and radially between the side surface and a relief opening defined within the plug portion, a channel defined through the plug portion along the slot, the plug portion connected to the face plate with the rear surface of the face plate arranged to substantially face the front surface of the plug portion, the plug portion sized and configured to be received by the pipe end with the side surface of the plug portion having a surface area generally coextensive with an inner contacted surface of the pipe end, the channel receiving a longitudinally translatable spreader member wherein at least one surface of the spreader member or the channel is tapered such that the spreader member and the channel cooperate to expand and retract the plug portion.

2. The locking cap of Claim 1 further comprising an actuator mechanism, the actuator mechanism having an actuator shaft which extends through the channel and is engaged with the spreader member such that as the actuator shaft rotates within the channel the spreader member translates within the channel.

3. The locking cap of Claim 2, wherein the actuator shaft has an actuator head portion, the actuator head portion being selectively engageable with a key head portion such that the key head portion selectively causes the actuator to rotate.

4. The locking cap of Claim 3, wherein the actuator head portion has a female pattern and the key head portion has a male pattern that is complementary to the female pattern.

5. The locking cap of Claim 4, wherein the female pattern is a cloverleaf consisting of seven apexes and eight wavy grooves interconnecting the seven apexes.

6. The locking cap of Claim 4, wherein the female pattern comprises at least five apexes.
7. The locking cap of Claim 1, wherein the plug portion is formed from brass.
8. A locking cap for an opening, the locking cap comprising a cap body, the cap body having an elastic expansion member and a spreader member, the elastic expansion member and the spreader member having a sloping interface such that relative axial movement of the expansion member and the spreader member result in radial displacement of at least a portion of the expansion member when under a biasing force from the spreader member such that the expansion member is urged into frictional interlock with an inner surface of the opening.
9. The locking cap for a pipe end of Claim 8 further comprising an actuator mechanism connected to either the expansion member or the spreader member.
10. The locking cap for a pipe end of Claim 8 further comprising an actuator mechanism connected to the spreader member.
11. The locking cap for a pipe end of Claim 10, wherein the actuator mechanism comprises a worm and follower actuator with the spreader member forming a follower portion.
12. The locking cap for a pipe end of Claim 10, wherein the actuator mechanism comprises a selectively intermeshing actuator shaft and key arrangement.
13. The locking cap for a pipe end of Claim 12 wherein the selectively intermeshing actuator shaft and key arrangement comprises a substantially male pattern arranged on one of the actuator shaft or the key and a substantially female pattern arranged on the other of the actuator shaft or the key.
14. The locking cap for a pipe end of Claim 10 further comprising an externally threaded surface extending substantially entirely around the expansion member configured to engage with an internally threaded surface of the pipe end.
15. A locking cap for a pipe end comprising a face plate, the face plate having a front surface and at least two pins projecting from the front surface, the face plate having a back surface and being connected to a plug portion such that the back surface of the face plate is proximate a surface of the plug portion, at least a portion of the plug portion being

capable of selective expansion and contraction to create a frictional interlock between the locking cap and the pipe end.

16. The locking cap for a pipe end of Claim 15 wherein the pins are selectively engageable by a key element for effecting leveraged rotation of the locking cap relative to the pipe end.

17. The locking cap for a pipe end of Claim 16, wherein two pins each have center lines and the centerlines are positioned a first distance apart, and wherein the key element further comprises a handle having at least two holes which are the first distance apart on center.

18. A lockable closure for an open end of a tubular element, the closure comprising a radially expanding member and an actuator shaft, the actuator shaft having a first end and a second end, the first end of the actuator shaft having a keyed configuration, the second end of the shaft extending through the closure into the tubular element, the actuator shaft being rotatable relative to the closure and being connected to the radially expanding member such that rotation of the actuator shaft in one direction effects generally outward movement of the radially expanding member and rotation of the actuator shaft in the other direction effects generally inward movement of the radially expanding member.

19. The lockable closure of Claim 18, wherein the keyed configuration comprises at least seven sides and corresponds to a keyed configuration of an associated key.

20. The lockable closure of Claim 19, wherein the lockable closure is engaged within open end of the tubular element through interlocking threads on a side surface of the lockable closure and within the open end of the tubular element.

21. A locking cap for closing an open end of a pipe that has a threaded inner surface, the locking cap comprising a generally cylindrical body having a threaded outer surface which is configured to engage the threaded inner surface of the pipe, the body being elastically deformable between a first diameter in which the body may be inserted into or removed from the open end, and a second diameter in which the body is frictionally locked within the pipe end, and a spreader assembly, including a bolt, coupled to the body such that rotation of the bolt causes the body to elastically deform between the first and second diameters.

22. The locking cap of Claim 21, wherein the first diameter is sized such that the body can be inserted or removed from the open end without rotation.

23. The locking cap of Claim 21, wherein about three full rotations of the bolt causes the body to elastically deform between the first and second diameters.

24. A locking cap key for locking and unlocking a locking cap, the key comprising a head and a handle, the head selectively engageable with a related structure on the locking cap and the handle being configured to plastically deform when a level of torque exceeds a predetermined level of torque.

25. The locking cap key of Claim 24, wherein the predetermined level of torque exceeds that required to lock the locking cap in position.

26. The locking cap key of Claim 24, wherein the key assumes a permanently set spiral twist as a result of the plastic deformation.

27. The locking cap key of Claim 24, wherein the head has a raised pattern disposed on a distal tip of the head.

28. The locking cap key of Claim 27, wherein the related structure on the locking cap includes a recessed pattern that is complementary to the raised pattern.

29. The locking cap key of Claim 24, wherein the handle includes a hanging ring.

30. The locking cap key of Claim 24, wherein the key has a generally T shaped configuration comprising a narrow arm portion and a cross-member, the cross-member having at least one hole disposed therein.